

10.1 Testing for water

Pure water boils at 100°C and freezes at 0°C . The presence of impurities in water raises the boiling point and lowers the freezing point. Salt spread on roads in winter lowers the freezing point of water and prevents ice forming when the temperature drops to 0°C .

Water turns anhydrous cobalt(II) chloride paper from blue to pink. It also turns anhydrous copper(II) sulphate from white to blue.

Aim

To test various liquids for water.

Apparatus and materials

Dropping pipette
Watch glass
pH paper and pH chart
Cobalt chloride paper
Anhydrous copper(II) sulphate
Paper towels
Tap water
Methylated spirits
Brine
Distilled water
Sea-water
Sucrose solution
Propanone
Dilute sulphuric acid, 2 mol dm^{-3}
Liquids labelled X, Y and Z

Procedure

- 1 Place one spatula measure of anhydrous copper(II) sulphate on a watch glass.
- 2 Use a dropping pipette to add six drops of tap water to the anhydrous copper(II) sulphate. Note the change in colour.
- 3 Wash off the copper(II) sulphate and dry the watch glass with a paper towel.
- 4 Add one drop of tap water to a piece of cobalt chloride paper and note any change in colour.
- 5 Add one drop of tap water to a piece of pH paper. Compare the colour produced with the pH chart and record the pH.
- 6 Repeat steps 1–5 with the other liquids and note if there is a colour change.
- 7 Repeat steps 1–5 with liquids X, Y and Z. Determine which of them contain water. Remember that propanone and methylated spirits are both flammable.

Results

Record the results of the test with cobalt chloride and anhydrous copper(II) sulphate as + or –.

liquid	tests	
	anhydrous copper(II) sulphate	cobalt chloride paper
tap water		
methylated spirits		
brine		
distilled water		
sea-water		
sucrose solution		
propanone		
dilute sulphuric acid		
X		
Y		
Z		

Extra work

- Measure the boiling point of distilled water. Add a spatula measure of salt to the boiled water and redetermine the boiling point.

Questions

- 1 a) Apart from the colour change what else happens when water is added to anhydrous copper(II) sulphate?
b) Describe the change in cobalt chloride paper when water is added to it.
c) Which of the liquids tested contain a small amount of water? State the reasons for your answer.
d) What is the pH of distilled water?
e) Which of the liquids X, Y and Z contain water?
- 2 Write an account of the water cycle and the treatment of water for domestic use. Refer to books in the library for your account.